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Introduction to Minitrack Network DSS: Decision Support in the Collaborative Environment of Mobile Social and Sensor Networks

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Network DSS: Decision Support in the Collaborative Environment of Mobile Social and Sensor Networks

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The network has clearly become the dominant paradigm in all information systems domains and the unparalleled degree of connectionism which it enables has radically altered how individuals, businesses, governments, and societies operate and communicate. With the proliferation of unmanned systems (USs) gaining public visibility for peacetime as well as military applications, the influence and capabilities of networks will be extended even further, although perhaps not always in ways that seem desirable.

The smart mobile handheld systems, in conjunction with other sensors, particularly unmanned vehicles, which are deployed in support of organizational decision-making objectives lead to a new, highly dynamic and complex form of DSS which we term *network-DSS* or *NWDSS.*

This Minitrack addresses the emerging elements of NWDSS domain. Central to the topic are challenges of integrating social and sensor networks into seamless manned-unmanned collaborative environments; collaborative service-driven processes for social and sensor networks on-the-move; synergy, adaptation, and collaboration between man and robotics exchanging services on top of tactical and global mobile networks; situational awareness services for mobile social and sensor networks; and holistic models of their behavior.

A Conceptual Model for Network Decision Support introduces the concept of a network DSS through the lens of human and machine heterogeneous nodes, connected by wireless technology, which may enter and leave the network at unpredictable times, yet must also cooperate in decision-making activities. It presents distinguishing properties of the NWDSS and proposes a 3-tier conceptual model comprised of digital infrastructure, transactive memory systems and emergent collaborative decision-making.

Intercepting a Target with Sensor Swarms introduces a new coordination method to intercept a mobile target in urban areas with a team of sensor platforms. The approach combines algorithmic concepts from ant colony and particle swarm optimization in order to modify the search and to spread the team in the search area. The algorithms introduced are tested in simulation experiments on grids.

Smartphone Enabled Dangerous Driving Report System proposes a novel dangerous driving report system using a smartphone. By collecting a stream of data through built-in GPS receiver, a time series of speed profile can be obtained for a given journey. An algorithm is proposed to detect anomaly in speed profile in order to detect whether a vehicle is speeding. As well as the ability to alert passengers in real-time in the case of speeding, the proposed system also records the journey data to be used as evidence when making a report. A case study using three different smartphones in the proposed framework is performed.

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